General

Guideline Title

Best evidence statement (BESt). Basic pediatric tracheostomy care.

Bibliographic Source(s)

Cincinnati Children's Hospital Medical Center. Best evidence statement (BESt). Basic pediatric tracheostomy care. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2011 Jun 11. 9 p. [3 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The strength of the recommendation (strongly recommended, recommended, or no recommendation) and the quality of the evidence (1a-5) are defined at the end of the "Major Recommendations" field.

Outcome: Maintaining Skin Integrity

1. It is recommended that skin care of the stoma and under the tracheostomy ties be provided at least daily, and more often if indicated, to prevent pressure necrosis and to maintain intact, clean and dry skin (Local Consensus [5]).
   Note 1: Skin care includes:
   - Inspection of peristomal and neck skin
   - Gentle cleansing of these areas with soap and water. If encrusted secretions are present, they can be removed with 0.5% hydrogen peroxide. Rinse skin with water, and dry.
   - Dressings (if indicated for excess secretions or to prevent pressure ulcers) to promote movement of moisture away from the skin and prevention of pressure necrosis
   - Ointments/creams appropriate for specific indications
     (Local Consensus [5])

   Note 2: Consultations with wound care specialists are available for children who have significant issues with skin integrity or skin care issues (Local Consensus [5]).
2. There is insufficient evidence and a lack of consensus to make a recommendation on the frequency of cleansing tracheostomies which have non-intact skin.

3. It is recommended, in order to preserve skin integrity, that decisions regarding securing the tracheostomy tube be individualized based on the needs of the child and caregiver resources, skills and preferences and include:
    - The tension of tracheostomy tube ties: adequate to prevent pressure necrosis without causing accidental decannulation
    - The materials used for securing tracheostomy tubes: consider twill, self-fastening, or metal bead chain

    (Sherman et al., 2000 [5]; Local Consensus [5]).

Outcome: Preventing Accidental Decannulation

4. It is recommended, in order to prevent accidental decannulation, that decisions regarding securing tracheostomy tube be individualized based on the needs of the child and caregiver resources, skills and preferences and include:
    - The tension of tracheostomy tube ties: adequate to prevent accidental decannulation without causing pressure necrosis
    - The materials used for securing tracheostomy tubes: consider twill, self-fastening, or metal bead chain

    (Sherman et al., 2000 [5]; Local Consensus [5])

Outcome: Maintaining Tracheostomy Tube Patency

5. It is recommended that tracheostomy tube suctioning be performed at least twice daily and as needed based on clinical assessment to assure tracheostomy tube patency (National Health Service Quality Improvement Scotland [NHS], 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5]).
6. It is recommended that suctioning technique includes:
    - A premeasured depth technique (NHS, 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5])
    - A rapid (<5 seconds) catheter pass (NHS, 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5])
    - Suctioning only while withdrawing the suction catheter
      Note: Suctioning while inserting and removing the catheter may be appropriate based on clinical assessment (for example in a patient with secretions bubbling from the tracheostomy tube and who needs hyperventilation or pre-oxygenation) (NHS, 2008 [5]; ATS, 2000 [5]; Local Consensus [5]).

    - Choice of suction catheter size based on clinical assessment
      Note: Recommendations in the literature vary between half the diameter of the tracheostomy tube to one that can be easily passed through the tracheostomy tube and effectively removes secretions (NHS, 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5]).

    - Selection of lowest effective pressure using equipment with an adjustable and measurable dial:
        - 60-80 mm Hg for neonates
        - 80-100 mm Hg for children
        - 80-120 mm Hg for adolescents
        - Note: In the case of highly viscous secretions, the above stated suction pressure ranges may be adjusted upwards.

      (NHS, 2008 [5]; Local Consensus [5])

    - Consideration of the need for pre-oxygenation or pre-ventilation based on clinical assessment (NHS, 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5])
    - That normal saline instillation NOT be used routinely (NHS, 2008 [5]; Sherman et al., 2000 [5]; Local Consensus [5])
      Note: Saline use may be appropriate based on clinical assessment as a means to stimulate a cough or loosen encrusted secretions (Local Consensus [5]).

7. It is recommended that tracheostomy tube changes are performed routinely by institutional standards to maintain airway patency (Local Consensus [5]).
   Note 1: Tracheostomy tubes are routinely changed at Cincinnati Children's Hospital Medical Center (CCHMC) every 2-4 weeks (Local Consensus [5]).

   Note 2: At CCHMC consultation with complex airway management resource personnel may be called upon for children who have significant issues with mucous plugging (Local Consensus [5]).

8. There is insufficient evidence and a lack of consensus to make a recommendation on the use of heated versus cool humidification in prevention of mucous plugging (Sherman et al., 2000 [5]).

Definitions:

Table of Evidence Levels

Quality Level	Definition
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5	Other: General review, expert opinion, case report, consensus report, or guideline

†a = good quality study; b = lesser quality study

Table of Recommendation Strength

Strength	Definition
"Strongly recommended"	There is consensus that benefits clearly outweigh risks and burdens (or vice-versa for negative recommendations).
"Recommended"	There is consensus that benefits are closely balanced with risks and burdens.
No recommendation made	There is lack of consensus to direct development of a recommendation.
Dimensions: In determining the strength of a recommendation, the development group makes a considered judgment in a consensus process that incorporates critically appraised evidence, clinical experience, and other dimensions as listed below.	
1. Grade of the body of evidence (see note above) 2. Safety/harm 3. Health benefit to the patients (direct benefit) 4. Burden to patient of adherence to recommendation (cost, hassle, discomfort, pain, motivation, ability to adhere, time) 5. Cost-effectiveness to healthcare system (balance of cost/savings of resources, staff time, and supplies based on published studies or onsite analysis) 6. Directness (the extent to which the body of evidence directly answers the clinical question [population/problem, intervention, comparison, outcome]) 7. Impact on morbidity/mortality or quality of life	

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Conditions requiring tracheostomies

Guideline Category

Management

Prevention

Clinical Specialty

Family Practice

Nursing

Pediatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To evaluate, in children with tracheostomies with intact skin (chronic/healthy tracheostomy), if soap and water cleansing once a day and as needed, compared to ½ strength hydrogen peroxide cleansing with the same frequency, is more effective in maintaining skin integrity
- To evaluate, in children with tracheostomies with non-intact skin, if increasing the frequency of cleansing, compared to the use of a dressing (any type), decreases the time to return to baseline skin integrity
- To evaluate, in children with tracheostomies, if the method of securing the tracheostomy tube influences skin integrity, considering tension, twill tape, self-fastening ties, or metal bead chain
- To evaluate, in children with tracheostomies, if the method of securing the tracheostomy tube influences the incidence of accidental decannulation
- To evaluate, in children with tracheostomies, if the frequency of suctioning influences tracheostomy tube patency
- To evaluate, in children with tracheostomies, if suctioning technique influences the rate of mucous plugs
- To evaluate, in children with tracheostomies, if the frequency of tracheostomy tube changes influences tracheostomy tube patency
- To evaluate, in children with tracheostomies, if heated humidification compared to cool humidification influences the frequency of mucous plugging

Target Population

Children birth to 18 years old with tracheostomies

Interventions and Practices Considered

1. Skin care of the stoma and under the tracheostomy ties
    - Skin inspection
    - Cleansing (soap and water, 0.5% hydrogen peroxide)
    - Dressings, ointment, creams as indicated
    - Consultation with wound care specialists
2. Securing the tracheostomy tube (individualized decision making)
3. Prevention of accidental decannulation (individualized decision making)
4. Maintenance of tracheostomy tube patency
    - Frequency of tube suctioning
    - Suctioning technique
5. Routine tracheostomy tube changes performed by institutional standards

Major Outcomes Considered

- Skin integrity
- Decannulation rates
- Tracheostomy tube patency

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

1. Databases: CINAHL
2. Search terms:
    - Tracheostomy care
    - Tracheotomy care
3. Limits and filters:
    - English
    - Humans
    - Age Range: all child (0-18 years)
    - Publication Date Range: 1999-2010

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Table of Evidence Levels

Quality Level	Definition
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5	Other: General review, expert opinion, case report, consensus report, or guideline

†a = good quality study; b = lesser quality study

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Table of Recommendation Strength

Strength	Definition
"Strongly recommended"	There is consensus that benefits clearly outweigh risks and burdens (or vice-versa for negative recommendations).
"Recommended"	There is consensus that benefits are closely balanced with risks and burdens.
No recommendation made	There is lack of consensus to direct development of a recommendation.
Dimensions: In determining the strength of a recommendation, the development group makes a considered judgment in a consensus process that incorporates critically appraised evidence, clinical experience, and other dimensions as listed below.	
1. Grade of the body of evidence (see note above) 2. Safety/harm 3. Health benefit to patient (direct benefit) 4. Burden to patient of adherence to recommendation (cost, hassle, discomfort, pain, motivation, ability to adhere, time) 5. Cost-effectiveness to healthcare system (balance of cost/savings of resources, staff time, and supplies based on published studies or onsite analysis) 6. Directness (the extent to which the body of evidence directly answers the clinical question [population/problem, intervention, comparison, outcome]) 7. Impact on morbidity/mortality or quality of life	

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

Reviewed against quality criteria by 2 independent reviewers

Evidence Supporting the Recommendations

References Supporting the Recommendations

National Health Service Quality Improvement Scotland. Best practice statement: caring for the child/young person with a tracheostomy. Edinburgh (Scotland): Healthcare Improvement Scotland; 2008.

Sherman JM, Davis S, Albamonte-Petrick S, Chatburn RL, Fitton C, Green C, Johnston J, Lyrene RK, Myer C 3rd, Othersen HB, Wood R, Zach M, Zander J, Zinman R. Care of the child with a chronic tracheostomy. Am J Respir Crit Care Med. 2000 Jan;161(1):297-308. PubMed

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Health benefits include healthy skin, airway patency and security, or appropriate humidity for mobile/active patients, and "in-line" with some ventilator dependent patients (the theoretical advantage is to provide 32 to 34 C° at 100% relative humidity of 33 to 37 mg H_2O/L matching normal airway physiology). There are minimal benefits that include infection reduction, granuloma reduction, and improved caregiver experience.

Potential Harms

- Side effects include skin redness, cutaneous or allergic reaction to cleaning product or dressing, potential skin breakdown if tracheostomy tube ties are too tight, potential suction trauma, increased "dead space" and airway resistance, or potential increased tracheal secretions.
- Infections, accidental decannulation, and mucus plugging are risks that cannot be completely eliminated in this medically fragile patient population.

Contraindications

Contraindications

Normal saline instillation should not be used routinely.

Qualifying Statements

Qualifying Statements

This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence

Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Cincinnati Children's Hospital Medical Center. Best evidence statement (BESt). Basic pediatric tracheostomy care. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2011 Jun 11. 9 p. [3 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2011 Jun 11

Guideline Developer(s)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

Source(s) of Funding

Cincinnati Children's Hospital Medical Center

Guideline Committee

Not stated

Composition of Group That Authored the Guideline

Group/Team Leaders: Cynthia Fitton, MSN, CNP, Pediatric Nurse Practitioner, Otolaryngology; Wendy Kochevar, MSN, CNP, Pediatric Nurse Practitioner, formerly Otolaryngology, currently Interdisciplinary Feeding Team

Other Group/Team Members: Linda Mitchell, RN, II, Neonatal Intensive Care Unit; Brandy Seger, RRT, Clinical Manager, Cardiac Care and Pediatric Intensive Care Units; Kim Crouch, RRT, Respiratory Therapist III, Complex Airway Unit; Marsha Blount, MSN, CNP, Pediatric Nurse Practitioner, Transitional Care Center; Kim Kombrinck, MSN, CNP, Pediatric Nurse Practitioner, Transitional Care Center

Consultants Regarding Suctioning: R. Paul Boesch, D.O., Assistant Professor, Pulmonary Medicine; Michael Rutter, M.D., Associate Professor, Otolaryngology; J. Paul Willging, M.D., Professor, Otolaryngology; Robert E. Wood, M.D., Professor, Pulmonary Medicine

Support Personnel: Susan McGee, MSN, RN, CPNP, Evidence-Based Practice Mentor, Center for Professional Excellence-Research and Evidence-Based Practice; Mary Hyder, Administrative Asst., Otolaryngology

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center .

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Cincinnati Children's Hospital Medical Center Health James M. Anderson Center for Health Systems Excellence at EBDMInfo@cchmc.org.

Availability of Companion Documents

The following are available:

- Judging the strength of a recommendation. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Jan. 1 p. Available from the Cincinnati Children's Hospital Medical Center .
- Grading a body of evidence to answer a clinical question. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 1 p. Available from the Cincinnati Children's Hospital Medical Center .
- Table of evidence levels. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Feb 29. 1 p. Available from the Cincinnati Children's Hospital Medical Center .

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Cincinnati Children's Hospital Medical Center Health James M. Anderson Center for Health Systems Excellence at EBDMInfo@cchmc.org.

Patient Resources

The following is available:

- Care of the child with a tracheostomy. Cincinnati (OH): Center for Infants and Children with Special Needs, Cincinnati Children's Hospital Medical Center; 2010 Mar. 36 p. Available in Portable Document Format (PDF) from the Cincinnati Children's Hospital Medical Center Web site .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on November 18, 2011.

Copyright Statement

Disclaimer

NGC Disclaimer

The National Guideline Clearinghouseâ„¢ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at http://www.guideline.gov/about/inclusion-criteria.aspx.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical

practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.